SAFETY DATA SHEET

## *Preparedto U.S. OSHA, CMA, ANSI, Canadian WHMIS 2015 GHS,European Union CLP EC 1272/2008 & the 8th ATP 2016/918, the Korean MoEL (Public Notice 2016-19), Singapore SS586 Standard –Parts 2 & 3, Chinese GB/T 16483-2008 & GB/T 17519-2013, Australian Work Health and Safety (Preparation of Safety Data Sheets for Hazardous Chemicals) Code of Practice 2015, Japanese JIS Z7250 and the Global Harmonization Standard*

**1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY UNDERTAKING**

TRADE NAME (AS LABELED):  **TISSUE DYES**

CHEMICAL NAME/CLASS: Alcohol and Water-Based Dyes

SYNONYMS: Not Applicable

PRODUCT USE: Tissue Staining Dyes

U.N. Number: None Allocated

U.N. DANGEROUS GOODS CLASS/SUBSIDIARY RISK: None Allocated

HAZCHEM CODE (AUSTRALIA): None Allocated

POISONS SCHEDULE NUMBER (AUSTRALIA): None Allocated

SUPPLIER/MANUFACTURER'S NAME: **ROYAL MARKER LLC**

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DATE OF PREPARATION: August 9, 2009

DATE OF REVISION: October 9, 2018

NOTE: ALL United States Occupational Safety and Health Administration (OSHA) Standard, 29 CFR Parts 1910, 1915, 1917, 1918 and 1926, and the U.S. OSHA Instruction CPL 02-02-079, July 9, 2015, U.S. State equivalent Standards, Canadian WHMIS 2015 GHS, European Union CLP EC 1272/2008 & the 8th ATP 2016/918, the Korean MoEL (Public Notice 2016-19), Singapore SS586 Standard – Parts 2 & 3, Chinese GB/T 16483-2008 & GB/T 17519-2013, Australian Work Health and Safety (Preparation of Safety Data Sheets for Hazardous Chemicals) Code of Practice 2015, Japanese JIS Z7253: 2013 &2015required information is included in appropriate sections based on the UN Global Harmonization Standard format. This product has been classified in accordance with the hazard criteria of the countries listed above.

**2. HAZARD IDENTIFICATION**

GLOBAL HARMONIZATION Labeling and Classification: Classified in accordance with Global Harmonization Standard under U.S. OSHA Hazard Communication Standard, European CLP Regulation (EC) 1272/2008, Japanese Classification JIS Z7253: 2013 &2015, Singapore SS586, Chinese GHS standard. Korean MoEL and New Zealand HSNO classification, are given separately.

Classification:Skin Irritation Cat. 2, Eye Irritation Cat. 2A, STOT (Inhalation-Irritation) SE Cat. 3

Signal Word:Warning Hazard Statement Codes:H315, H319, H335

Precautionary Statement Codes:P261, P264,P271, P280, P302 + P352, P332 + P313, P362 + P364, P305 + P351 + P338, P337 + P313, P304 + P340, P312, P321,P403 + P233, P405, P501



Hazard Symbols/Pictograms: GHS07

When the product contains more than 1.0% of the Proprietary Red Pigment # 2, the following classification applies:

Classification:Skin Irritation Cat. 2, Eye IrritationCat. 2A, STOT (Inhalation-Irritation) SE Cat. 3, Skin Sensitization Cat. 1B

Signal Word:Warning Hazard Statement Codes:H315, H319, H335, H317

Precautionary Statement Codes:P261, P264, P271, P280, P302 + P352, P333 + P313, P362 + P364, P305 + P351 + P338, P337 + P313, P304 + P340, P312, P321,P403 + P233, P405, P501



Hazard Symbols/Pictograms: GHS07

When the product contains more than 1.0% of the Proprietary Yellow Pigment # 2, the following classification applies:

Classification:Skin Irritation Cat. 2, Eye Irritation Cat. 2A, STOT (Inhalation-Irritation) SE Cat. 3, Aquatic Acute Toxicity Cat. 3, Aquatic Chronic Toxicity Cat. 4

Signal Word: Warning Hazard Statement Codes:H315, H319, H335, H403, H413

Precautionary Statement Codes:P261, P264, P271,P273, P280, P302 + P352, P332 + P313, P362 + P364, P305 + P351 + P338, P337 + P313, P304 + P340, P312, P321,P403 + P233, P405, P501



Hazard Symbols/Pictograms: GHS07

When the product contains more than 1.0% each of the Proprietary Red Pigment # 2 and Proprietary Yellow Pigment # 2, the following classification applies:

Classification:Skin Irritation Cat. 2, Eye Irritation Cat. 2A, STOT (Inhalation-Irritation) SE Cat. 3, Skin Sensitization Cat. 1B, Aquatic Acute Toxicity Cat. 3, Aquatic Chronic Toxicity Cat. 4

Signal Word:Warning Hazard Statement Codes:H315, H319, H335, H317, H403, H413

Precautionary Statement Codes:P261, P264, P271,P273, P280, P302 + P352, P333 + P313, P362 + P364, P305 + P351 + P338, P337 + P313, P304 + P340, P312, P321,P403 + P233, P405, P501



Hazard Symbols/Pictograms: GHS07

**2. HAZARD IDENTIFICATION (Continued)**

KOREAN MoEL (Notice 2016-19) Labeling and Classification:Classified in accordance with MoEL Notice 2016-19. Under the MoEL regulation, the following differences in classification are applicable.Note: When the product contains the Proprietary Yellow Pigment # 2 component, the following differences of classification are applicable.

When the product contains more than 1.0% of the Proprietary Red Pigment # 2, the following classification applies:

Classification:Skin Irritation Cat. 2, Eye Irritation Cat. 2A, STOT (Inhalation-Irritation) SE Cat. 3

Signal Word: Warning Hazard Statement Codes:H315, H319, H335

Precautionary Statement Codes:P261, P264, P271, P280, P302 + P352, P332 + P313, P362 + P364, P305 + P351 + P338, P337 + P313, P304 + P340, P312, P321,P403 + P233, P405, P501



Hazard Symbols/Pictograms: GHS07

When the product contains more than 1.0% each of the Proprietary Red Pigment # 2 and Proprietary Yellow Pigment # 2, the above classification applies:

NEW ZEALAND HAZARDOUS SUBSTANCES and NEW ORGANISMS ACT (HNSO) CHEMICAL CLASSIFICATION:

Product Group Standard:Not Otherwise Classified, Subsidiary Hazard

Classification:6.3B: Mildly irritating to the skin. 6.4A: Irritating to the eye. 6.1E: Irritating to the respiratory system.

When the product contains more than 1.0% of the Proprietary Red Pigment # 2, the following classification applies:

Product Group Standard:Not Otherwise Classified, Subsidiary Hazard

Classification:6.3B: Mildly irritating to the skin. 6.4A: Irritating to the eye. 6.1E: Irritating to the respiratory system. 6.5B: Contact sensitizer.

When the product contains more than 1.0% of the C.I. Yellow Pigment 83, the following classification applies:

Product Group Standard:Not Otherwise Classified, Subsidiary Hazard

Classification:6.3B: Mildly irritating to the skin. 6.4A: Irritating to the eye. 6.1E: Irritating to the respiratory system. 9.1C (fish): Harmful in the aquatic environment.

When the product contains more than 1.0% each of the Proprietary Red Pigment # 2 and Proprietary Yellow Pigment # 2, the above classification applies:

Product Group Standard:Not Otherwise Classified, Subsidiary Hazard

Classification:6.3B: Mildly irritating to the skin. 6.4A: Irritating to the eye. 6.1E: Irritating to the respiratory system. 6.5B: Contact sensitizer. 9.1C (fish): Harmful in the aquatic environment.

NEW ZEALAND HAZARDOUS SUBSTANCES and NEW ORGANISMS ACT (HNSO) CHEMICAL CLASSIFICATION FOR COMPONENTS: See Section 16 for classification of individual components.

See Section 16 for full text of Classification

|  |
| --- |
| **EMERGENCY OVERVIEW:Product Description:** These products are clear, colored liquids that have a mild alcohol odor. **Health Hazards:** The primary health hazard associated with this product is the potential for irritation by inhalation as well as skin and eye contact. When the product contains one of the pigments, there is a potential hazard of skin sensitization in persons susceptible to this compound. The dyes may stain skin, eyes and other contaminated tissue. **Flammability Hazards:** These products are not flammablebut may ignite if exposed to direct flame or high temperature for a prolonged period. **Reactivity Hazards:** These products are not reactive. **Environmental Hazards:**One of the pigment components may cause acute and long-term harm to aquatic organisms. All accidental release should be avoided. **Emergency Recommendations:** Emergency responders must wear the personal protective equipment suitable for the situation to which they are responding. |

**3. COMPOSITION and INFORMATION ON INGREDIENTS**

| **Chemical Name** | **CAS #** | **European EINECS #** | **Japanese ENC#** | **Korean ECL #** | **Chinese IECSC Inventory** | **New ZealandNZIoC** | **% w/w** | **LABEL ELEMENTS****GHS under U.S. OSHA & EU CLP (1272/2008), Australian, Japanese, Korean, Singapore, and Chinese Classification****Hazard Statement Codes** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Primary Alcohol | Proprietary | Listed | Proprietary | 5.0-8.0% | GHS Under All CountriesClassification: Flammable Liquid Cat. 2, Eye Irritation Cat. 2A, STOT (Inhalation, Ingestion-Narcotic Effects) SE Cat. 3Hazard Statement Codes: H226, H319, H336 |
| Styrene Acrylic Polymer Resin | Proprietary | Not Listed | Not Listed | Proprietary | Listed | May be used as component | 0.0-3.0% | GHS Under All CountriesClassification: Skin Irritation Cat. 2, Eye Irritation Cat. 2A, STOT (Inhalation-Irritation) SE Cat. 3Hazard Statement Codes: H315, H319, H335 |
| PigmentsSolutions can include more than 1 pigment; pigment content may be up to 15% | Up to 15.0% |  |
| C.I. Pigment Black 7 | 1333-86-4 | 215-609-9 | Excepted as a Mineral | KE-04682 | Listed | HSR002801 | GHS Under All CountriesClassification: Carcinogenic Cat. 2Hazard Statement Codes: H351i |
| Blue Pigment | Proprietary | Listed | May be used as component | GHS Under All Countries Except U.S: Not ClassifiedUnder U.S. OSHA: Combustible Dust Hazard |

See Section 16 for full classification information.

**3. COMPOSITION and INFORMATION ON INGREDIENTS (Continued)**

| **Chemical Name** | **CAS #** | **EuropeanEINECS #** | **Japanese ENC#** | **Korean ECL #** | **Chinese IECSC Inventory** | **New ZealandNZIoC** | **% w/w** | **LABEL ELEMENTS****GHS under U.S. OSHA & EU CLP (1272/2008), Japanese and Chinese Classification****Korean ISHA Classification****Hazard Statement Codes** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pigments (continued)Solutions can include more than 1 pigment; pigment content may be up to 15% | Up to 15.0% |  |
| Green Pigment | Proprietary | Listed | May be used as component | GHS Under All Countries Except U.S: Not ClassifiedUnder U.S. OSHA: Combustible Dust Hazard |
| Red Pigment | Proprietary | Listed | May be used as component | GHS Under All Countries: Not Classified |
| Red Pigment # 2 | Proprietary | Not Listed | Not Listed | Not Listed | May be used as component | GHS Under All CountriesClassification: Skin Sensitization Cat. 1BHazard Statement Codes: H317 |
| Orange Pigment | Proprietary | Not Listed | Proprietary | Listed | May be used as component | GHS Under All Countries: Not Classified |
| Yellow Pigment | Proprietary | Not Listed | Proprietary | Listed | May be used as component | GHS Under All Countries: Not Classified |
| Yellow Pigment # 2 | Proprietary | Not Listed | Proprietary | Listed | May be used as component | GHS Under All Countries Except KoreaClassification: Acute Oral Toxicity Cat. 4, Aquatic Acute Toxicity Cat. 3, Aquatic Chronic Toxicity Cat. 4Hazard Statement Codes: H302, H402, H413KOREANMoEL:Classification: Acute Oral Toxicity Cat. 4Hazard Statement Codes: H302 |
| Proprietary Violet Pigment | Proprietary | Not Listed | Proprietary | Listed | HSR001180 | GHS Under All CountriesClassification: Eye Irritation Cat. 2AHazard Statement Codes: H319 |
| C.I. White 7 | 13463-67-7 | 236-675-7 | 1-558 | KE-33900 | Listed | May be used as component | GHS Under All CountriesClassification: Carcinogenic Cat. 2Hazard Statement Codes: H351i |
| Water and other components. Each of the other components is present in less than 1 percent concentration (0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens). | Balance | GHS Under All Countries:Not Classified |

See Section 16 for classification of product and components.

**4. FIRST-AID MEASURES**

PROTECTION OF FIRST AID RESPONDERS: First-aid responders should not attempt to treat victims of exposure to this material without adequate personal protective equipment. Rescuers should be taken for medical attention, if necessary.

DESCRIPTION OF FIRST AID MEASURES:Victim(s) must be taken for medical attention. Remove victim(s) to fresh air, as quickly as possible. Only trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation, when necessary. Take copy of label and SDS to physician or other health professional with victim(s).

Skin Exposure: If these products contaminate the skin, immediately begin decontamination with running water and soap. The minimum recommended flushing time is 20 minutes. Remove exposed or contaminated clothing, taking care not to contaminate eyes. The contaminated individual must seek medical attention if any adverse effect occurs.

Eye Exposure: If vapors, sprays, or mists of these products enter the eyes, open the contaminated individual’s eyes while under gently running water. Use sufficient force to open eyelids. Have the contaminated individual "roll" eyes. Minimum flushing is for 20 minutes. The contaminated individual must seek medical attention if any adverse effect occurs.

Inhalation: If vapors, sprays, or mists of these products are inhaled, remove the contaminated individual to fresh air. If necessary, remove or cover gross contamination to avoid exposure to rescuers. Seek medical attention if adverse effect occurs.

Ingestion: If these products are swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. DO NOT INDUCE VOMITING, unless directed by medical personnel. Have victim rinse mouth with water if conscious. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or unable to swallow. If vomiting occurs, lean patient forward or place on left side (head-down position if possible) to maintain an open airway and prevent aspiration.

IMPORTANT SYMPTOMS AND EFFECTS: See Sections 2 (Hazard Identification) and 11 (Toxicological Information).

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing dermatitis and other skin conditions may be aggravated by prolonged overexposures to this material.Persons developing hypersensitivity reactions should receive immediate medical attention.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate overexposure.

**5. FIRE-FIGHTING MEASURES**

FLASH POINT: Not determined. AUTOIGNITION TEMPERATURE: Not determined.

FLAMMABLE LIMITS (in air by volume, %):Not determined.

FIRE EXTINGUISHING MATERIALS:Unless incompatibilities exist for surrounding materials, carbon dioxide, water spray, ‘ABC’ type chemical extinguishers, foam, dry chemical and halon extinguishers can be used to fight fires involving this product.

UNSUITABLE FIRE EXTINGUISHERS: None known.

AUSTRALIAN HAZCHEM CODE: Not applicable.

**5. FIRE-FIGHTING MEASURES(Continued)**

SPECIFIC HAZARDS ARISING FROM THE PRODUCT: When involved in a fire, these products may decompose and produce irritating vapors and toxic gases (e.g., carbon and nitrogen oxides). Depending on the pigments in the product, involvement in a fire may also produce copper and titanium oxides, phthalimide, chlorine, hydrogen cyanide or ammonia.

Explosion Sensitivity to Mechanical Impact or Static Discharge: Not sensitive.

**1**

**HEALTH**

**FLAMMABILITY**

**INSTABILITY**

**OTHER**

**NFPA RATING**

**1**

**0**

Hazard Scale: **0** = Minimal **1** = Slight **2** = Moderate

**3** = Serious **4** = Severe

SPECIAL PROTECTIVE ACTIONS FOR FIRE-FIGHTERS: Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Due to the presence of colorants, the runoff water from these products can discolor contaminated objects. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas. If necessary, rinse fire-response equipment with soapy water before returning it to service.

**6. ACCIDENTAL RELEASE MEASURES**

PERSONAL PRECAUTIONS: Proper protective equipment should be used. In the event of a spill, clear the area and protect people. The atmosphere must have levels of components lower than those listed in Section 8, (Exposure Controls and Personal Protective Equipment) if applicable, and have at least 19.5 percent oxygen before personnel can be allowed into the area without Self-Contained Breathing Apparatus (SCBA).

PROTECTIVE EQUIPMENT:

Small Spills: For incidental spills (e.g., less than 1 liters of liquid from a bottle), wear rubber gloves, splash goggles, and appropriate body protection. Wipe up spilled liquid with polypads or other suitable absorbent materials. Wash contaminated area with soap and water, absorb with paper towels, and rinse with water.

Large Spills: For spill of 10 liters or more, trained personnel following pre-planned procedures should handle non-incidental releases. Minimum Personal Protective Equipment should be rubber gloves, rubber boots, face shield, and Tyvek suit**.**Minimum level of personal protective equipment for releases in which the level of oxygen is less than 19.5% or is unknown must be **Level B: triple-gloves (rubber gloves and nitrile gloves over latex gloves), chemical resistant suit and boots, hard hat, and Self-Contained Breathing Apparatus.**If necessary, discard all stained response equipment or rinse with soapy water before returning such equipment to service.

METHODS FOR CLEANUP AND CONTAINMENT:

Small Spills:Absorb spill with non-reactive absorbent, wearing protective equipment described above.

Large Spills:Ensure exposure limits are below those given in Section 8 (Exposure Controls-Personal Protective Equipment), if applicable, before personal are allowed in spill area without personal protective equipment. Dike spilled material to prevent contamination to environment and surrounding materials. Absorb spill with non-reactive absorbent, wearing protective equipment described above.Trained personnel following pre-planned procedures should handle non-incidental releases. Access to the spill areas should be restricted. Monitor area and confirm levels are bellow exposure limits given in Section 8 (Exposure Controls-Personal Protection), if applicable, before non-response personnel are allowed into the spill area.

All Spills: Decontaminate the area of the spill thoroughly using detergent and water. Place all spill residue in an appropriate container and seal. Move to a secure area. Do not mix with wastes from other materials. Prevent material from entering sewer or confined spaces, waterways, soil or public waters.If necessary, discard all stained response equipment or rinse with soapy water before returning such equipment to service. Dispose of in accordance with applicable international, national, state, and local procedures (see Section 13, Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS:Prevent material from entering sewer or confined spaces, waterways, soil or public waters. Do not flush to sewer. For spills on water, contain, minimize dispersion and collect.

**7. HANDLING and STORAGE**

PRECAUTIONS FOR SAFE HANDLING: All employees who handle this material should be trained to handle it safely. Minimize all exposure to this substance. As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing this product. Containers of this product must be properly labeled.

CONDITIONS FOR SAFE STORAGE: Keep container tightly closed when not in use. Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Material should be stored in secondary containers or in a diked area, as appropriate. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged. Store containers in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Material should be stored in secondary containers or in a diked area, as appropriate. Store containers away from incompatible chemicals (see Section 10, Stability and Reactivity). Post warning and “NO SMOKING” signs in storage and use areas, as appropriate. Inspect all incoming containers before storage to ensure containers are properly labeled and not damaged.

SPECIFIC USE(S): These products are used for staining tissues in a laboratory setting. Follow all industry standards for use of these products.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain that application equipment is locked and tagged-out safely. Always use this product in areas where adequate ventilation is provided. Decontaminate equipment thoroughly, before maintenance begins. Collect all rinsates and dispose of according to applicable Federal, State, or local procedures.

**8. EXPOSURE CONTROLS - PERSONAL PROTECTION**

EXPOSURE LIMITS/CONTROL PARAMETERS:

Ventilation and Engineering Controls: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided in this section. Use local exhaust ventilation. Normal office ventilation conforming to the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Standards is adequate under normal circumstances of use. Persons using this material should consult a qualified Ventilation Engineer and/or Industrial Hygienist if concerns about exposures arise. If necessary, refer to Australian National Code of Practice for the Control of Workplace Hazardous Substances [NOHSC: 2007 (1994)] for further information. As with all chemicals, ensure proper decontamination equipment (e.g., eyewash/safety shower stations) is available near areas where this material is used as necessary.

Occupational/Workplace Exposure Limits/Guidelines:

|  |  |  |
| --- | --- | --- |
| CHEMICAL NAME | CAS # | EXPOSURE LIMITS IN AIR |
| ACGIH-TLVs | OSHA-PELs | NIOSH-RELs | NIOSH | OTHER |
| TWA | STEL | TWA | STEL | TWA | STEL | IDLH |  |
| mg/m3 | mg/m3 | mg/m3 | mg/m3 | mg/m3 | mg/m3 | mg/m3 | mg/m3 |
| C.I. Pigment Black 7 | 1333-86-4 | 3 (inhal. fract.) | NE | 3.5 (inhal. fract.) | NE | 3.5 (in the presence of PAHs, as PAHs; 10-hr TWA | NE | 1750 | DFG MAKs: As inhalable dustCarcinogen: IARC-2B, MAK-3B, NIOSH-Ca (in the presence of PAHs); TLV-A3 |
| See NIOSH Pocket Guide Apps. A & C |
| Proprietary Blue PigmentExposure limits given are for Copper & its inorganic compounds | NE | NE | NE | NE | NE | NE | NE | DFG MAKs:TWA = 0.01(respirable fraction)PEAK = 2•MAK, 15 min. average value, 1-hr interval, 4 per shiftDFG MAK Pregnancy Risk Classification: CCarcinogen: EPA-D |
| Proprietary Green Pigment | NE | NE | NE | NE | NE | NE | NE | NE |
| Proprietary Orange Pigment | NE | NE | NE | NE | NE | NE | NE | NE |
| Proprietary Red Pigment | NE | NE | NE | NE | NE | NE | NE | NE |
| Proprietary Red Pigment # 2 | NE | NE | NE | NE | NE | NE | NE | NE |
| Proprietary Yellow Pigment | NE | NE | NE | NE | NE | NE | NE | NE |
| Proprietary Yellow Pigment # 2 | NE | NE | NE | NE | NE | NE | NE | NE |
| Proprietary Violet Pigment | NE | NE | NE | NE | NE | NE | NE | NE |
| C.I. Pigment White 7 | 13463-67-7 | 10 | NE | 15 (total dust); 10 (vacated 1989 PEL) | NE | See NIOSH Pocket Guide App. A | 5000 | Carcinogen: TLV-A4, IARC-2B, MAK-3A, NIOSH-Ca |
| Proprietary Primary Alcohol | 492 | 984 | 980 | 500 ppm (vacated 1989 PEL) | 980 | 1225 | 2000 ppm (based on 10% of LEL) | DFG MAKs:TWA = 500PEAK = 2•MAK, 15 min. average value, 1-hr interval, 4 per shiftDFG MAK Pregnancy Risk Classification: CCarcinogen: IARC-3. TLV-A4 |
| Styrene Acrylic Polymer Resin | NE | NE | NE | NE | NE | NE | NE | NE |

NE = Not Established. See Section 16 for Definitions of Other Terms Used

International Occupational Exposure Limits: Currently, thefollowing international limits established for components of these products.

**C.I. Pigment Black 7**

|  |  |  |
| --- | --- | --- |
|  | Limit Value - Eight Hours | Limit Value - Short Term |
| Belgium | 3.5 mg/m³ |  |
| Canada (Ontario) | 3 mg/m³ (1) |  |
| Canada ([Québec](http://www.dguv.de/webcode/e786792))  | 3.5 mg/m³ |  |
| Denmark | 3.5 mg/m³ | 7 mg/m³ |
| Finland | 3.5 mg/m³ | 7 mg/m³ (1) |
| France | 3.5 mg/m³ |  |
| Ireland | 3.5 mg/m³ | 7 mg/m³ (1) |
| Israel | 3 mg/m³ (1) |  |
| Japan JSOH | 1mg/m³ (1) |  |
|  | 3 mg/m³ (2) |  |
| New Zealand | 3 mg/m³ |  |
| People’s Republic of China | 4 mg/m³ (1) |  |
| Singapore | 3.5 mg/m³ |  |
| South Korea | 3.5 mg/m³ |  |
| Spain | 3.5 mg/m³ |  |
| Sweden | 3 mg/m³ |  |
|  | Remarks |  |
| Canada - Ontario | (1) Inhalable fraction |
| Finland | (1) 15 minutes average value |
| Ireland | (1) 15 minutes reference period |
| Israel | (1) Inhalable fraction |
| Japan - JSOH | (1) Respirable dust (2) Total dust: Total dust comprises particles with a flow speed of 50 to 80 cm/sec at the entry of a particle sampler. |
| People's Republic of China | (1) Inhalable fraction |

**8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)**

EXPOSURE LIMITS/CONTROL PARAMETERS (continued):

International Occupational Exposure Limits (continued):

**Proprietary Blue Pigment**

|  |  |  |
| --- | --- | --- |
|  | Limit Value - Eight Hours | Limit Value - Short Term |
| Latvia | 5mg/m³ |  |

**C.I. Pigment White 7**

|  |  |  |
| --- | --- | --- |
|  | Limit Value - Eight Hours | Limit Value - Short Term |
| Belgium | 10mg/m³ |  |
| Canada (Ontario) | 10mg/m³ (1) |  |
| Canada ([Québec](http://www.dguv.de/webcode/e786792))  | 10mg/m³ |  |
| Denmark | 6mg/m³ (total dust) | 12mg/m³ (total dust) |
| France | 11mg/m³ (inhalable aerosol) |  |
| Ireland | 10mg/m³ (1) |  |
|  | 4mg/m³ (2) |  |
| Japan JSOH | 0.3mg/m³ (1) |  |
| Latvia | 10mg/m³ |  |
| New Zealand | 10mg/m³ (1) |  |
| People’s Republic of China | 8mg/m³ (1) |  |
| Poland | 10mg/m³ | 30mg/m³ |
| Romania | 10mg/m³ | 15mg/m³ (1) |
| Singapore | 10mg/m³ |  |
| South Korea | 10mg/m³ |  |
| Spain | 10mg/m³ (inhalable aerosol) |  |
| Sweden | 5mg/m³ (inhalable aerosol) |  |
| Switzerland | 3mg/m³ (respirable aerosol) |  |
|  | Remarks |  |
| Ireland | (1) Inhalable fraction. (2) Respirable fraction. |
| Japan - JSOH | (1) Nanoparticle, as Ti. |
| New Zealand | (1) The value is for inhalable dust containing no asbestos and less than 1% free silica. |
| People's Republic of China | (1) Inhalable fraction. |
| Romania | (1) 15 minutes average value. |

**Proprietary Primary Alcohol**

|  |  |  |
| --- | --- | --- |
|  | Limit Value - Eight Hours | Limit Value - Short Term |
| Austria | 200 ppm; 500mg/m³ | 800 ppm; 2000mg/m³ |
| Belgium | 400 ppm | 400 ppm; 1000mg/m³ |
| Canada (Ontario) | 200 ppm; 500mg/m³ | 400 ppm |
| Canada ([Québec](http://www.dguv.de/webcode/e786792))  | 400 ppm; 983mg/m³ | 500 ppm; 1230mg/m³ |
| Denmark | 200 ppm; 490mg/m³ | 400 ppm; 980mg/m³ |
| Finland | 200 ppm; 500mg/m³ | 250 ppm; 620mg/m³ (1) |
| France |  | 400 ppm; 980mg/m³ |
| Germany (AGS) | 200 ppm; 500mg/m³ | 400 ppm (1); 1000mg/m³ (1) |
| Germany (DFG) | 200 ppm; 500mg/m³ | 400 ppm (1); 1000mg/m³ (1) |
| Hungary | 500mg/m³ | 2000mg/m³ |
| Ireland | 200 ppm | 200 ppm (1) |
| Japan | 400 ppm |  |
| Japan JSOH | 400 ppm (1); 980mg/m³ (1) |  |
| Latvia | 350mg/m³ | 600mg/m³ (1) |
| New Zealand | 400 ppm; 983mg/m³ | 500 ppm; 1230mg/m³ |
| People’s Republic of China | 350mg/m³ | 700mg/m³ (1) |
| Poland | 900mg/m³ | 1200mg/m³ |
| Romania | 70 ppm; 600mg/m³ | 93 ppm (1); 800mg/m³ (1) |
| Singapore | 400 ppm; 983mg/m³ | 500 ppm; 1230mg/m³ |
| South Korea | 200 ppm; 480mg/m³ | 400 ppm; 980mg/m³ |
| Spain | 200 ppm; 500mg/m³ | 400 ppm; 1000mg/m³ |
| Sweden | 150 ppm; 350mg/m³ | 250 ppm (1); 600mg/m³ (1) |
| Switzerland | 200 ppm; 500mg/m³ | 400 ppm; 1000mg/m³ |
|  | Remarks |  |
| Finland | (1) 15 minutes average value. |
| Germany (AGS) | (1) 15 minutes average value. |
| Germany (DFG) | STV 15 minutes average value. |
| Ireland | (1) 15 minutes average value. |
| Japan - JSOH | (1) Occupational exposure limit ceiling: Reference value to the maximal exposure concentration of the substance during a working day. |
| Latvia | (1) 15 minutes average value. |
| People's Republic of China | (1) 15 minutes average value. |
| Romania | (1) 15 minutes average value. |
| Sweden | (1) 15 minutes average value. |

Australian Hazardous Chemical Information System (HMIS) Exposure Standards:

|  |  |  |
| --- | --- | --- |
| CHEMICAL NAME | CAS # | EXPOSURE STANDARDS |
| TWAppm | TWAmg/m-3 | STELppm | STELmg/m-3 | Notes |
| C.I. Pigment Black 7 | 1333-86-4 | NE | 3 | NE | NE | Not Applicable |
| Proprietary Blue Pigment (copper fume, as Cu) | 14-14-8 | NE | 0.2 | NE | NE | Not Applicable |
| (copper mists, as Cu) |  | NE | 1 | NE | NE | Not Applicable |
| C.I. Pigment White 7 | 13463-67-7 | NE | 10 | NE | NE | H (see Chapter 14) |
| Proprietary Primary Alcohol | 67-63-0 | 400 | 983 | 500 | 1230 | Not Applicable |

NE = Not Established.

**8. EXPOSURE CONTROLS - PERSONAL PROTECTION (Continued)**

EXPOSURE LIMITS/CONTROL PARAMETERS (continued):

International Occupational Exposure Limits (continued):

UK Minimum Exposure Limits:

|  |  |  |
| --- | --- | --- |
| CHEMICAL NAME | CAS # | WORKPLACE EXPOSURE LIMIT |
| Long-Term Exposure Limit(8-Hrs TWA Reference Period) | Short-Term Exposure Limit(15-minute Reference Period) | Comments |
| The Carcin, Sen and Skin notations are not exhaustive. Notations have been applied to substances identified in IOELV Directives |
| ppm | mg.m-3 | ppm | mg.m-3 |
| C.I. Pigment Black 7 | 1333-86-4 | NE | 3.5 | NE | 7 | NE |
| Proprietary Blue Pigment (fume, as Cu) | 147-14-8 | NE | 0.2 | NE | NE | NE |
| (mists, as Cu) |  | NE | 1 | NE | 2 | NE |
| C.I. Pigment White 7 (respirable) | 13463-67-7 | NE | 4 | NE | NE | NE |
| (total inhalable) |  | NE | 10 | NE | NE | NE |
| Proprietary Primary Alcohol | 67-63-0 | 400 | 999 | 500 | 1250 | NE |

NE = Not Established.

ACGIH Biological Exposure Indices (BEIs): Currently, the following Biological Exposure Indices (BEIs) have been established for the Potassium Dichromate componentof this product.

|  |  |  |
| --- | --- | --- |
| CHEMICAL:DETERMINANT | SAMPLING TIME | BEI |
| Proprietary Primary Alcohol•Acetone in Urine | • End of Shift at End of Workweek | •40 mg/L |

UK Biological Monitoring Guidance Values (BMGVs): Currently,noBMGVshave been established for thecomponents of this product.

PROTECTIVE EQUIPMENT: *The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132, including U.S. Federal OSHA Respiratory Protection (29 CFR 1910.134), OSHA Eye Protection 29 CFR 1910.133, OSHA Hard Protection 29 CFR 1910.138, OSHA Foot Protection 29 CFR 1910.136 and OSHA Body Protection 29 CFR1910.132), equivalent standards of Canada (including CSA Respiratory Standard Z94.4-02, Z94.3-M1982,* Industrial Eye and Face Protectors *and CSA Standard Z195-02,* Protective Footwear*), standards of EU member states (including EN 529:2005 for respiratory PPE, CEN/TR 15419:2006 for hand/body protection, and CR 13464:1999 for face/eye protection), standards of Australia (including AS/NZS 1715:1994 for respiratory PPE, AS/NZS 4501.2:2006 for protective clothing, AS/NZS 2161.1:2000 for glove selection, and AS/NZS 1336:1997 for eye protection), or standards of Japan (including JIS T 8116:2005 for glove selection, JIS T 8150:2006 for respiratory PPE, JIS T 8147:2003 for eye protectors, and JIS T 8030:2005 for protective clothing). Please reference applicable regulations and standards for relevant details.*

Respiratory Protection:Maintain airborne contaminant concentrations below exposure limits listed in this section, if applicable. If respiratory protection is needed, use only protection authorized in applicable regulations. Oxygen levels below 19.5% are considered IDLH by U.S. OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA’s Respiratory Protection Standard (1910.134-1998). The following are U.S. NIOSH Respiratory Equipment Guidelines for Proprietary Primary Alcohol and are provided to assist in selection of respiratory PPE in event of presence of aerosols.

**PROPRIETARY PRIMARY ALCOHOL**

CONCENTRATION RESPIRATORY PROTECTION

Up to 2000 ppm: Any Supplied-Air Respirator (SAR) operated in a continuous-flow mode, or any Chemical Cartridge Respirator with a full facepiece and organic vapor cartridge(s), or any Air-Purifying, Full-Facepiece Respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister, or any Powered, Air-Purifying Respirator (PAPR) with organic vapor cartridge(s), or any Self-Contained Breathing Apparatus (SCBA) with a full facepiece, or any SAR with a full facepiece.

Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions: Any SCBA that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode, or any SAR that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in pressure-demand or other positive-pressure mode.

Escape: Any Air-Purifying, Full-Facepiece Respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister, or any appropriate escape-type, SCBA.

**Eye Protection:** Splash goggles or safety glasses. If necessary, refer to appropriate regulations.

**Hand Protection:** Wear gloves appropriate for use with glycol ethers and alcohols. Use triple gloves for spill response, as stated in Section 6 (Accidental Release Measures) of this SDS. If necessary, refer to appropriate regulations.

**Body Protection:**If necessary, refer to the OSHA Technical Manual (Section VII: Personal Protective Equipment) or appropriate Standards of Canada. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee’s feet may be exposed to electrical hazards, use foot protection under appropriate regulations.

**9. PHYSICAL and CHEMICAL PROPERTIES**

FORM: Liquid. COLOR: Depends on pigments in product.

MOLECULAR WEIGHT: Mixture. MOLECULAR FORMULA: Mixture.

ODOR: Mild alcohol.

ODOR THRESHOLD: For Proprietary Primary Alcohol: Geometric mean: 43 ppm (detection)

VAPOR DENSITY (air = 1): Not established. EVAPORATION RATE (*n*-BuAc = 1): Not established.

**9. PHYSICAL and CHEMICAL PROPERTIES (Continued)**

SPECIFIC GRAVITY (water = 1): Not established. MELTING/FREEZING POINT: Not established.

SOLUBILITY IN WATER: Solubility will differ depending on the pigments in the product.

OTHER SOLUBILITIES: Not known. BOILING POINT: Not established.

VAPOR PRESSURE: Not established. pH: Not established.

ODOR THRESHOLD: Not established. FLASH POINT: Not determined.

COEFFICIENT OF OIL/WATER DISTRIBUTION (PARTITION COEFFICIENT): Not established.

HOW TO DETECT THIS SUBSTANCE (warning properties): The odor and color of these products may be distinguishing characteristics.

**10. STABILITY and REACTIVITY**

CHEMICAL STABILITY: Stable under conditions of normal temperature and pressure.

DECOMPOSITION PRODUCTS: Combustion: If exposed to extremely high temperatures, these products can decompose to generate carbon and nitrogen oxides.Depending on the pigments in the product, involvement in a fire may also produce copper and titanium oxides, phthalimide, chlorine, hydrogen cyanide or ammonia.Hydrolysis: None known.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Strong oxidizers, water-reactive materials.

POSSIBILITY OF HAZARDOUS POLYMERIZATION OR OTHER DANGEROUS REACTIONS: Will not occur.

OXIDIZING PROPERTIES: Not applicable.

EXPLOSIVE PROPERTIES: Not applicable.

CONDITIONS TO AVOID: Exposure to or contact with extreme temperatures and incompatible chemicals.

**11. TOXICOLOGICAL INFORMATION**



SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE: The most significant routes of occupational overexposure are inhalation and contact with skin and eyes. The symptoms of overexposure to this material, via route of entry, are as described as follows in this section.

Inhalation: These products do not normally present a significant inhalation hazard under anticipated circumstances of use due to small volume of product in containers. Inhalation of vapors, mists, or sprays of this material, may mildly irritate the nose, throat, and other tissues of the respiratory system.

Contact with Skin or Eyes: Skin contact may cause mild irritation in sensitive individuals. Repeated or prolonged skin overexposure may cause dermatitis (dry, red skin) and defatting of the skin, due to the Proprietary Primary Alcohol component. One component is a potential skin sensitizer. Contact with the product when it contains this component may cause rash, itching and redness. Eye contact with this material can mildly to moderately irritate the eyes, causing discomfort, tearing, and redness, depending on concentration and duration of exposure.

Skin Absorption: The Proprietary Primary Alcoholcomponent can be absorbed via intact skin. Due to small volume of the product in containers, this route of exposure is not expected to be significant, however, some systemic effects may be possible; all skin exposure should be avoided.

Ingestion: Though not anticipated to be a significant route of occupational exposure, ingestion of large quantities of this material may cause nausea, vomiting, diarrhea, and discoloration of the mouth, teeth, and tissues of the throat.

Injection: Accidental injection of this liquid (as may occur by a puncture with a contaminated object) will cause local pain, irritation, and redness.

Hazard Scale: **0** = Minimal **1** = Slight **2** = Moderate

**3** = Serious **4** = Severe \* = Chronic hazard

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in **Lay Terms**. In the event of overexposure, the following symptoms may be observed:

Acute: The product may stain hair, skin, and other contaminated tissue. Acute exposure to this material via skin contact, eye contact, and inhalation may mildly irritate contaminated tissue. Ingestion of large amounts may cause nausea, vomiting, diarrhea.

Chronic: Repeated or prolonged skin overexposure may cause dermatitis (dry, red skin).

TARGET ORGANS: ACUTE: Skin, central nervous system, eyes. CHRONIC: Skin, kidneys, liver, reproductive system.

TOXICITY DATA: Specific toxicology data currently available for components of these products are as follows.

**PROPRIETARY PRIMARY ALCOHOL:**

LDLo (oral, man) = 5272 mg/kg; Behavioral: coma; Vascular: BP lowering not characterized in autonomic section; Lungs, Thorax, or Respiration: chronic pulmonary edema

LDLo (oral, human) = 3570 mg/kg; Behavioral: coma; Lungs, Thorax, or Respiration: respiratory depression; Gastrointestinal: nausea or vomiting

LDLo (unreported, man) = 2770 mg/kg

TDLo (oral, man) = 14,432 mg/kg; Behavioral: coma; Vascular: BP lowering not characterized in autonomic section; Lungs, Thorax, or Respiration: dyspnea

TDLo (oral, human) = 223 mg/kg; Behavioral: hallucinations, distorted perceptions; Cardiac: pulse rate; Vascular: BP lowering not characterized in autonomic section

TDLo (oral, rat) = 6480 mg/kg/male 26 weeks pre; Reproductive effects

TDLo (oral, infant) = 13 gm/kg; Behavioral: somnolence (general depressed activity), irritability; Gastrointestinal: nausea or vomiting

Skin Irritancy (rabbit) = 500 mg; mild

Eye Irritancy (rabbit) = 100 mg; severe

**PROPRIETARY PRIMARY ALCOHOL (continued):**

Eye Irritancy (rabbit) = 10 mg; moderate

LD50 (oral, rat) = 5045 mg/kg

LD50 (oral, mouse) = 3600 mg/kg

LD50 (oral, rabbit) = 6410 mg/kg

LD50 (skin, rabbit) = 12,800 mg/kg

LD50 (intravenous, rat) = 1099 mg/kg

LD50 (intravenous, mouse) = 1509 mg/kg

LD50 (intravenous, rabbit) = 1184 mg/kg

LD50 (intraperitoneal, rat) = 2735 mg/kg

LD50 (intraperitoneal, mouse) = 4477 mg/kg

LD50 (intraperitoneal, rabbit) = 667 mg/kg

LD50 (intraperitoneal, guinea pig) = 2560 mg/kg

LD50 (intraperitoneal, hamster) = 3444 mg/kg

LDLo (oral, dog) = 1537 mg/kg; Gastrointestinal: nausea or vomiting

LDLo (oral, cat) = 6 mL/kg

LCLo (inhalation, rat) = 16,000 ppm/4 hours

**11. TOXICOLOGICAL INFORMATION (Continued)**

TOXICITY DATA (continued):

**PROPRIETARY PRIMARY ALCOHOL (continued):**

LCLo (inhalation, mouse) = 12,800 ppm/3 hours

LDLo (subcutaneous, mouse) = 6000 mg/kg

LDLo (intravenous, dog) = 5120 mg/kg

LDLo (intravenous, cat) = 1963 mg/kg

LDLo (parenteral, frog) = 20 g/kg; Peripheral Nerve and Sensation: spastic paralysis with or without sensory change; Behavioral: somnolence (general depressed activity)

TCLo (inhalation, rat) = 10,000 ppm/7 hours/female 1–19 days post; Teratogenic effects

Cytogenetic Analysis (*Saccharomyces cerevisiae*) = 200 mmol/tube

Cytogenetic Analysis (inhalation, rat) = 1030 µg/m3/16 weeks/intermittent

**C.I. PIGMENT BLACK 7:**

LD50 (Oral-Rat) >15400 mg/kg: Behavioral: somnolence (general depressed activity)

LD50 (Skin-Rabbit) >3 gm/kg

TCLo (Inhalation-Rat) 7 mg/m3: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TCLo (Inhalation-Rat) 1.66 mg/m3/7 hours: Lungs, Thorax, or Respiration: sputum; Blood: changes in leukocyte (WBC) count; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TCLo (Inhalation-Rat) 50 mg/m3: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TCLo (Inhalation-Rat) 229 mg/m3/6 hours: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TCLo (Inhalation-Rat) 50 mg/m3/6 hours/90 days-intermittent: Lungs, Thorax, or Respiration: other changes

TCLo (Inhalation-Rat) 1 mg/m3/13 weeks-intermittent: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TCLo (Inhalation-Rat) 1 mg/m3/13 weeks-intermittent: Lungs, Thorax, or Respiration: other changes, changes in lung weight; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TCLo (Inhalation-Rat) 50 mg/m3/13 weeks-intermittent: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): other

TCLo (Inhalation-Rat) 50 mg/m3/13 weeks-intermittent: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): other, Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TCLo (Inhalation-Rat) 7 mg/m3/6 hours/13 weeks-intermittent: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TCLo (Inhalation-Rat) 11,600 µg/m3/18 hours/2 years-intermittent: Tumorigenic: carcinogenic by RTECS criteria; Lungs, Thorax, or Respiration: tumors

TCLo (Inhalation-Mouse) 50 mg/m3/6 hours: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified

TCLo (Inhalation-Mouse) 1 mg/m3/13 weeks-intermittent: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TCLo (Inhalation-Mouse) 1 mg/m3/13 weeks-intermittent: Lungs, Thorax, or Respiration: other changes, changes in lung weight; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TCLo (Inhalation-Mouse) 7 mg/m3/6 hours/13 weeks-intermittent: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TCLo (Inhalation-Hamster) 7 mg/m3/13 weeks-intermittent: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TCLo (Inhalation-Hamster) 50 mg/m3/6 hours/13 weeks-intermittent: Sense Organs and Special Senses (Olfaction): effect, not otherwise specified

TDLo (Oral-Mouse) 20,000 µg/kg/4 weeks-intermittent: Brain and Coverings: other degenerative changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TDLo (Skin-Rat) 11 gm/kg/4 weeks-intermittent: Blood: pigmented or nucleated red blood cells; Liver: changes in liver weight; Nutritional and Gross Metabolic: weight loss or decreased weight gain

**C.I. PIGMENT BLACK 7 (continued):**

TDLo (Intravenous-Rat) 10 mg/kg/2 minutes: Liver: changes in liver weight; Blood: changes in spleen

TDLo (Intravenous-Rat) 10 mg/kg/2 minutes: Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: hepatic microsomal mixed oxidase (dealkylation, hydroxylation, etc.)

TDLo (Intratracheal-Rat) 16 mg/kg: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TDLo (Intratracheal-Rat) 15 mg/kg: Lungs, Thorax, or Respiration: other changes; Biochemical: Enzyme inhibition, induction, or change in blood or tissue levels: cytochrome oxidases (including oxidative phosphorylation)

TDLo (Intratracheal-Rat) 10 mg/kg: Lungs, Thorax, or Respiration: sputum; Biochemical: Metabolism (Intermediary): other proteins; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TDLo (Intratracheal-Mouse) 1000 µg/kg: Lungs, Thorax, or Respiration: other changes; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TDLo (Intratracheal-Mouse) 20 mg/kg/4 days-intermittent: Lungs, Thorax, or Respiration: sputum; Immunological Including Allergic: increase in cellular immune response; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TDLo (Intratracheal-Mouse) 4000 µg/kg/4 weeks-intermittent: Lungs, Thorax, or Respiration: other changes; Immunological Including Allergic: increase in cellular immune response; Biochemical: Metabolism (Intermediary): effect on inflammation or mediation of inflammation

TDLo (Parenteral-Mouse) 36 µg/kg/3 days-intermittent: Immunological Including Allergic: increase in humoral immune response

Mutation in Microorganisms (Bacteria-*Salmonella typhimurium*) 1 mg/plate

DNA Adduct (Inhalation-Mouse) 6200 µg/m3/16 hours/12 weeks-intermittent

DNA Damage (Human Lymphocyte) 16 µg/L/48 hours

DNA Damage (Inhalation-Rat) 50 ug/L/13 weeks-intermittent

DNA Damage (Inhalation-Rat) 50 gm/L/13 weeks

**PROPRIETARY BLUE PIGMENT:**

LD (Oral-Rat) >15 gm/kg

LD (Intraperitoneal-Rat) >3 gm/kg: Kidney/Ureter/Bladder: urine volume decreased, proteinuria

LD50 (Oral-Rat) > 5000 mg/kg

LC50 (Inhalation-Rat) > 6400 mg/kg

**PROPRIETARY GREEN PIGMENT:**

LD (Oral-Rat) >10 gm/kg

TDLo (Oral-Rat) 18,200 mg/kg/26 weeks-intermittent: Lungs, Thorax, or Respiration: changes in lung weight; Liver: changes in liver weight; Blood: changes in leukocyte (WBC) count

Mutation in Microorganisms (Bacteria-*Salmonella typhimurium*) 3333 µµg/plate

**PROPRIETARY RED PIGMENT:**

LD50(Oral-Rat) >23 gm/kg: Behavioral: changes in motor activity (specific assay); Gastrointestinal: hypermotility, diarrhea; Skin and Appendages: hair

LD50(Oral-Rat) >5000 mg/kg

LD50(Oral-Mouse) >5000 mg/kg

LD50(Skin-Rabbit) >3 gm/kg

**C.I. PIGMENT WHITE 7:**

Standard Draize Test (skin, human) 300 mg/3 days/intermittent; Mild irritation effects

TCLo (inhalation, rat) 250 mg/m3/6 hours/2 years/intermittent; Tumorigenic: Carcinogenic by RTECS criteria: Lungs, Thorax, or Respiration: tumors

TC (inhalation, rat) 10 mg/m3/18 hours/2 years/intermittent; Tumorigenic: Carcinogenic by RTECS criteria; Lungs, Thorax, or Respiration: tumors

TDLo (intramuscular, rat) 360 mg/kg/ 2 years/intermittent; Neoplastic effects

TD (intramuscular, rat) 260 mg/kg/84 weeks/intermittent; Equivocal tumorigenic agent

Micronucleus Test (intraperitoneal, mouse) = 3 g/kg/3 days/continuous

DNA Inhibition (lung, hamster) = 500 mg/L

**PROPRIETARY YELLOW PIGMENT # 2:**

Standard Draize Test (Skin-Rabbit) 500 mg: Mild

LD50(Oral-Rat) >1750 mg/kg

LD50(Oral-Mammal-Species Unspecified) >10,000 mg/kg

CARCINOGENIC POTENTIAL OF COMPONENTS: Components of this product are listed by agencies tracking the carcinogenic properties of chemical compounds, as follows:

**C.I. PIGMENT BLACK 7:** ACGIH TLV-A3 (Confirmed Animal Carcinogen with Unknown Relevance to Humans); IARC-2B (Possibly Carcinogenic to Humans); MAK-3B (Substances for Which *In Vitro* Tests or Animal Studies have Yielded Evidence of Carcinogenic Effects that is Not Sufficient for Classification of the Substance in One of the Other Categories. Further studies are required before a final classification can be made.); NIOSH-Ca [in the presence of PAHs] (Potential Occupational Carcinogen, with No Further Categorization)

**PROPRIETARY BLUE PIGMENT:** EPA-D (Not Classifiable as to Human Carcinogenicity)

**C.I. PIGMENT WHITE 7:** ACGIH TLV-A4 (Not Classifiable as a Human Carcinogen); IARC-2B (Possibly Carcinogenic to Humans); MAK-3A (Substances for Which the Criteria for Classification in Category 4 or 5 are Fulfilled, but for which the database is insufficient for the establishment of a MAK value); NIOSH-Ca (Potential Occupational Carcinogen, with No Further Categorization)

**PROPRIETARY PRIMARY ALCOHOL:**ACGIH TLV-A4 (Not Classifiable as a Human Carcinogen); IARC-3 (Unclassifiable as to Carcinogenicity)

The remaining components of these products are not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, and CAL/OSHA and therefore are neither considered to be nor suspected to be cancer-causing agents by these agencies.

IRRITANCY OF PRODUCT: Acute exposure to this product via skin contact, eye contact, and inhalation may mildly irritate contaminated tissue.

**11. TOXICOLOGICAL INFORMATION (Continued)**

SENSITIZATION TO THE PRODUCT: The Proprietary Red Pigment # 2 component is a suspect skin sensitizer that may cause redness, itching or hives after skin contact in susceptible persons.

REPRODUCTIVE TOXICITY INFORMATION: No components of this product are known to have mutagenic, embryotoxic, teratogenic or reproductive toxicity effects in humans.

**12. ECOLOGICAL INFORMATION**

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

MOBILITY: This product has not been tested for mobility in soil. It is expected to be somewhat mobile in soil.

PERSISTEANCE AND BIODEGRADABILITY: This product has not been tested for persistence or biodegradability. It is expected that some biodegradation will occur to this product; however, no specific information is known.

BIO-ACCUMULATION POTENTIAL: These products have not been tested for bio-accumulation potential. The Proprietary Yellow Pigment # 2 component has the potential to bioaccumulate.

EFFECT OF MATERIALON PLANTS or ANIMALS: This product may be harmful to plant or animal life, especially if large volumes of this product are released.

EFFECT OF CHEMICAL ON AQUATIC LIFE: This product has not been tested for aquatic toxicity. These products may be harmful or fatal to contaminated aquatic plant and animal life. The following are aquatic toxicity data for some components of this product:

**ISOPROPANOL:**

EC0 (*Microcystis aeruginosa*) 8 days = 1,000 mg/L

EC0 (*Scenedesmus quadricauda* green algae) 7 days = 1,800 mg/L

EC0 (*Entosiphon sulcatum* protozoa) 72 hours = 4,930 mg/L

EC0 (Uronema parduczi Chatton-Lwoff) = 3,425 mg/L

EC50 (*Photobacterium*) 5 minutes = 22,800 mg/L

EC50 (*Daphnia magna*) 3,010 mg/L

EC50 (*Pseudomonas putida*) 16 hours = 1,050 mg/L

Toxic (*Chlorella pyrenoidosa* algae) = 17,400 mg/L

NOEC (*Daphnia magna*) 757-2,100 mg/L

LC0 (creek chub) 24 hours = 900 mg/L

LC50 (*Artemia salina*) 24 hours = 16,700 mg/L

LC50 (*Streptocephalus proboscideus*) 24 hours = 11,600 mg/L

LC50 (*Daphnia magna*) 24 hours = 9,500 mg/L

**PROPRIETARY PRIMARY ALCOHOL (continued):**

LC50 (*Brachionus calyciflorus*) 24 hours = 28,600 mg/L

LC50 (*Crangon crangon* brown shrimp) 48 hours = 1,400 mg/L

LC50 (*Crangon crangon* brown shrimp) 98 hours = 1,150 mg/L

LC50 (goldfish) 24 hours = > 500 mg/L

LC50 (fathead minnow) 1 hour = 11,830 mg/L

LC50 (fathead minnow) 24 hours = 11,160 mg/L

LC50 (fathead minnow) 48 hours = 11,130 mg/L

LC50 (fathead minnow) 72 hours = 11,130 mg/L

LC50 (fathead minnow) 96 hours = 11,130 mg/L

LC50 (*Poecilia reticulata* guppy) 7 days = 7,060 mg/L

LC50 (*Daphnia magna*) 4,600 mg/L

LC100 (creek chub) 24 hours = 1,100 mg/L

**PROPRIETARY YELLOW PIGMENT # 2:**

LC50 (*Oncorhynchus mykiss* Rainbow trout,donaldson trout) 48 hours = 18 mg/L

OTHER ADVERSE EFFECTS: This product does not contain any component with known ozone depletion potential.

RESULTS OF PBT AND vPvB ASSESSMENT: No Data Available. PBT and vPvB assessments are part of the chemical safety report required for some substances in European Union Regulation (EC) 1907/2006, Article 14.

ENVIRONMENTAL EXPOSURE CONTROLS: Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

**13. DISPOSAL CONSIDERATIONS**

DISPOSAL METHODS: It is the responsibility of the generator to determine at the time of disposal whether the product meets the criteria of a hazardous waste per regulations of the area in which the waste is generated and/or disposed of. Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority.Shipment of wastes must be done with appropriately permitted and registered transporters.

DISPOSAL CONTAINERS: Waste materials must be placed in and shipped in appropriate 5-gallon or 55-gallon poly or metal waste pails or drums. Permeable cardboard containers are not appropriate and should not be used. Ensure that any required marking or labeling of the containers be done to all applicable regulations.

PRECAUTIONS TO BE FOLLOWED DURING WASTE HANDLING: Wear proper protective equipment when handling waste materials.

U.S. EPA WASTE NUMBER: Not applicable to wastes consisting only of these products.

EUROPEAN WASTE CODES: 08 03 99: Wastes Not Otherwise Specified

**14. TRANSPORTATION INFORMATION**

U.S. DEPARTMENT OF TRANSPORTATION:These products are not classified as dangerous goods, per U.S. DOT regulations, under 49 CFR 172.101.

TRANSPORT CANADA, TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: These products are NOT classified as dangerous goods, per regulations of Transport Canada.

INTERNATIONAL AIR TRANSPORT ASSOCIATION SHIPPING INFORMATION (IATA): These products are NOT classified as dangerous goods.

INTERNATIONAL MARITIME ORGANIZATION SHIPPING INFORMATION (IMO): These products are NOT classified as dangerous goods.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR): These products are NOT classified by the United Nations Economic Commission for Europe to be dangerous goods.

AUSTRALIAN FEDERAL OFFICE OF ROAD SAFETY CODE FOR THE TRANSPORTATION OF DANGEROUS GOODS BY ROAD OR RAIL: These products are NOT classified as dangerous goods, per regulations of the Australian Federal Office of Road Safety.

**15. REGULATORY INFORMATION**

UNITED STATES REGULATIONS:

U.S. SARA Reporting Requirements: The components of these products are not subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act.

U.S. SARA Threshold Planning Quantity (TPQ): There are no specific Threshold Planning Quantities for the components of these products. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

U.S. CERCLA Reportable Quantity (RQ): Not applicable.

U.S. TSCA Inventory Status: The components of these products are listed on the TSCA Inventory.

U.S. Hazardous Air Pollutant (HAPs): The components of these products are not listed by the EPA under section 112(b) of the Clean Air Act as a ‘HAP’.

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65): The components of these productsare not on the Proposition 65 Lists.

CANADIAN REGULATIONS:

Canadian DSL/NDSL Inventory Status: The components of these productsare listed on the DSL Inventory.

Canadian Environmental Protection Act (CEPA) Priority Substances Lists: The components of these productsare listed as follows under the CEPA.

Proprietary Primary Alcohol, Proprietary Red Pigment, Proprietary Violet Pigment and Proprietary Yellow Pigment # 2: Substances on Environment Canada/Health Canada Pilot Project List (CEPA 1999, Section 73).Meet categorization criteria: \*may present, to individuals in Canada, the greatest potential for exposure; or \*are persistent or bioaccumulative in accordance with the regulations, and inherently toxic to human beings or to non-human organisms, as determined by laboratory or other studies.

Canadian WHMIS (HPR-GHS) 2015 Classification and Symbols:See Section 16 for in Classification and Symbols under HPR-GHS 2015.

EUROPEAN UNION REGULATIONS:

Safety, Health, and Environmental Regulations/Legislation Specific for the Substance:Currently, there is no specific legislation pertaining to this product.

Chemical Safety Assessment: No data available. The chemical safety assessment is required for some substances according to European Union Regulation (EC) 1907/2006, Article 14.

AUSTRALIAN REGULATIONS:

Australian Inventory of Chemical Substances (AICS) Status: The components of this product are listed on the AICS as indicated in Section 3 (Composition and Information on Ingredients).

Hazardous Substances Information System (HSIS): All components are listed in the HSIS.

Standard for the Uniform Scheduling of Drugs and Poisons: Not applicable.

JAPANESE REGULATIONS:

Japanese ENCS: Components are on the ENCS Inventory, as indicated in Section 3 (Composition and Information on Ingredients).

Japanese Ministry Of Economy, Trade, and Industry (METI) Status:No component is listed as a Specified Chemical Substance.

Poisonous and Deleterious Substances Control Law: No component is listed as a Specified Poisonous Substance under the Poisonous and Deleterious Substances Control Law.

KOREAN REGULATIONS:

Korean Existing Chemical Substances Inventory Status: Components are listed on the Korean Existing Chemicals List, as indicated in Section 3 (Composition and Information on Ingredients).

CHINESE REGULATIONS:

Chinese Inventory of Existing Chemical Substances Status: Components are listed on the ChineseInventory of Existing Chemical Substances (IECSC),as indicated in Section 3 (Composition and Information on Ingredients).

NEW ZEALAND REGULATIONS:

New Zealand Inventory of Chemicals (NZIoC): The components of this product are on the NZIoC, as indicated in Section 3 (Composition and Information on Ingredients).

MEXICAN REGULATIONS:

Mexican Workplace Regulations (NOM-018-STPS-2000):This product is classified as hazardous.

**16. OTHER INFORMATION**

GLOBAL HARMONIZATION Labeling and Classification: Classified in accordance with Global Harmonization Standard under U.S. OSHA Hazard Communication Standard, CLP Regulation (EC) 1272/2008, Japanese JIS Z7253: 2015. For information on Korean ISHA and New Zealand HSNO classification, see below.

Classification:Skin Irritation Category 2, Eye Irritation Category 2A, Specific Target Organ Toxicity (Inhalation-Irritation) Single Exposure Category 3

Signal Word: Warning

Hazard Statements:H315: Causes skin irritation. H319: Causes serious eye irritation.H335: May cause respiratory irritation.

Precautionary Statements:

*Prevention:*P261: Avoid breathing mists, sprays, fume. P264: Wash thoroughly after handling. P271: Use only outdoors or in a well-ventilated area. P280: Wear protective gloves/protective clothing/eye protection/face protection.

*Response:*P302 + P352: IF ON SKIN: Wash with plenty of soap and water. P332 + P313: If skin irritation occurs, get medical attention.P362 + P364: Take off contaminated clothing and wash it before reuse.P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.

**16. OTHER INFORMATION (Continued)**

GLOBAL HARMONIZATION Labeling and Classification (continued):

Precautionary Statements (continued):

*Response (continued):*P337 + P313: If eye irritation persists: Get medical advice/attention.P304 + P340: If inhaled, remove victim to fresh air and keep at rest in a position comfortable for breathing.P312: Call a POISONCENTER or doctor if you feel unwell. P321: Specific treatment (remove from exposure and treat symptoms). Refer to other portions of precautionary text on this label, SDS or other product information sheets, as appropriate.

*Storage:* P403 + P233: Store in a well-ventilated place. Keep container tightly closed. P405: Store locked up.

*Disposal:*P501: Dispose of contents/containers in accordance with all local, regional, national and international regulations.

Hazard Symbols/Pictograms: GHS07

When the product contains more than 1.0% of the Proprietary Red Pigment # 2, the following classification applies:

Classification:Skin Irritation Category 2, Eye Irritation Category 2A, Specific Target Organ Toxicity (Inhalation-Irritation) Single Exposure Category 3, Skin Sensitization Category 1B

Signal Word: Warning

Hazard Statements:H315: Causes skin irritation. H319: Causes serious eye irritation.H335: May cause respiratory irritation.H317: May cause an allergic skin reaction.

Precautionary Statements:

*Prevention:*P261: Avoid breathing mists, sprays, fume. P264: Wash thoroughly after handling. P271: Use only outdoors or in a well-ventilated area. P280: Wear protective gloves/protective clothing/eye protection/face protection.

*Response:*P302 + P352: IF ON SKIN: Wash with plenty of soap and water. P333 + P313: If skin irritation or rash occurs: Get medical advice/attention.P362 + P364: Take off contaminated clothing and wash it before reuse.P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. P337 + P313: If eye irritation persists: Get medical advice/attention.P304 + P340: If inhaled, remove victim to fresh air and keep at rest in a position comfortable for breathing.P312: Call a POISONCENTER or doctor if you feel unwell. P321: Specific treatment (remove from exposure and treat symptoms). Refer to other portions of precautionary text on this label, SDS or other product information sheets, as appropriate.

*Storage:* P403 + P233: Store in a well-ventilated place. Keep container tightly closed. P405: Store locked up.

*Disposal:*P501: Dispose of contents/containers in accordance with all local, regional, national and international regulations.

Hazard Symbols/Pictograms: GHS07

When the product contains more than 1.0% of the Proprietary Yellow Pigment # 2, the following classification applies:

Classification:Skin Irritation Category 2, Eye Irritation Category 2A, Specific Target Organ Toxicity (Inhalation-Irritation) Single Exposure Category 3, Aquatic Acute Toxicity Category 3, Aquatic Chronic Toxicity Category 4

Signal Word: Warning

Hazard Statements:H315: Causes skin irritation. H319: Causes serious eye irritation.H335: May cause respiratory irritation.H402: Harmful to aquatic life. H413: May cause long-lasting harmful effects to aquatic life.

Precautionary Statements:

*Prevention:*P261: Avoid breathing mists, sprays, fume. P264: Wash thoroughly after handling. P271: Use only outdoors or in a well-ventilated area. P273: Avoid release to the environment.P280: Wear protective gloves/protective clothing/eye protection/face protection.

*Response:*P302 + P352: IF ON SKIN: Wash with plenty of soap and water. P332 + P313: If skin irritation occurs, get medical attention.P362 + P364: Take off contaminated clothing and wash it before reuse.P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. P337 + P313: If eye irritation persists: Get medical advice/attention.P304 + P340: If inhaled, remove victim to fresh air and keep at rest in a position comfortable for breathing.P312: Call a POISONCENTER or doctor if you feel unwell. P321: Specific treatment (remove from exposure and treat symptoms). Refer to other portions of precautionary text on this label, SDS or other product information sheets, as appropriate.

*Storage:* P403 + P233: Store in a well-ventilated place. Keep container tightly closed. P405: Store locked up.

*Disposal:*P501: Dispose of contents/containers in accordance with all local, regional, national and international regulations.

Hazard Symbols/Pictograms: GHS07

When the product contains more than 1.0% both of the Proprietary Red Pigment # 2 and Proprietary Yellow Pigment # 2, the following classification applies:

Classification:Skin Irritation Category 2, Eye Irritation Category 2A, Specific Target Organ Toxicity (Inhalation-Irritation) Single Exposure Category 3, Skin Sensitization Category 1B, Aquatic Acute Toxicity Category 3, Aquatic Chronic Toxicity Category 4

Signal Word: Warning

Hazard Statements:H315: Causes skin irritation. H319: Causes serious eye irritation.H335: May cause respiratory irritation.H402: Harmful to aquatic life. H413: May cause long-lasting harmful effects to aquatic life.

Precautionary Statements:

*Prevention:*P261: Avoid breathing mists, sprays, fume. P264: Wash thoroughly after handling. P271: Use only outdoors or in a well-ventilated area. P273: Avoid release to the environment.P280: Wear protective gloves/protective clothing/eye protection/face protection.

*Response:*P302 + P352: IF ON SKIN: Wash with plenty of soap and water. P333 + P313: If skin irritation or rash occurs: Get medical advice/attention.P362 + P364: Take off contaminated clothing and wash it before reuse.P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. P337 + P313: If eye irritation persists: Get medical advice/attention.P304 + P340: If inhaled, remove victim to fresh air and keep at rest in a position comfortable for breathing.P312: Call a POISONCENTER or doctor if you feel unwell. P321: Specific treatment (remove from exposure and treat symptoms). Refer to other portions of precautionary text on this label, SDS or other product information sheets, as appropriate.

*Storage:* P403 + P233: Store in a well-ventilated place. Keep container tightly closed. P405: Store locked up.

*Disposal:*P501: Dispose of contents/containers in accordance with all local, regional, national and international regulations.

Hazard Symbols/Pictograms: GHS07

**16. OTHER INFORMATION (Continued)**

KOREAN ISHA (Notice 2009-68) Labeling and Classification:Classified in accordance with ISHA Notice 2009-68. Under ISHA, no differences in classification are applicable, when the product contains the C.I. Red Pigment component. When the product contains the C.I. Yellow Pigment 83, the classification remains the same as original classification as well.

NEW ZEALAND HAZARDOUS SUBSTANCES and NEW ORGANISMS ACT (HNSO) CHEMICAL CLASSIFICATION: In addition to the GHS classification provided under GHS earlier in this Section, the product is further classified as follows under the regulation:

Product Group Standard:Not Otherwise Classified, Subsidiary Hazard

Classification:6.3B: Mildly irritating to the skin. 6.4A: Irritating to the eye. 6.1E: Irritating to the respiratory system.

Response Statements: P103: Read label before use.

When the product contains more than 1.0% of the Proprietary Red Pigment # 2, the following classification applies:

Product Group Standard:Not Otherwise Classified, Subsidiary Hazard

Classification:6.3B: Mildly irritating to the skin. 6.4A: Irritating to the eye. 6.1E: Irritating to the respiratory system. 6.5B: Contact sensitizer.

Response Statements: P103: Read label before use.

When the product contains more than 1.0% of the C.I. Yellow Pigment 83, the following classification applies:

Product Group Standard:Not Otherwise Classified, Subsidiary Hazard

Classification:6.3B: Mildly irritating to the skin. 6.4A: Irritating to the eye. 6.1E: Irritating to the respiratory system. 9.1C (fish): Harmful in the aquatic environment.

Response Statements: P103: Read label before use.

When the product contains more than 1.0% each of the Proprietary Red Pigment # 2 and Proprietary Yellow Pigment # 2, the above classification applies:

Product Group Standard:Not Otherwise Classified, Subsidiary Hazard

Classification:6.3B: Mildly irritating to the skin. 6.4A: Irritating to the eye. 6.1E: Irritating to the respiratory system. 6.5B: Contact sensitizer. 9.1C (fish): Harmful in the aquatic environment.

Response Statements: P103: Read label before use.

COMPONENT CLASSIFICATION:

Labeling and Classification Full Text under GHS:

**Proprietary Primary Alcohol:** This is a published-classification.

*Classification:*Flammable Liquid Category 3, Skin Irritation Category. 2, Eye Irritation Category 2A, Specific Target Organ Toxicity (Inhalation-Narcotic Effect) Single Exposure Category 3

*Hazard Statements:*H226: Flammable liquid and vapour. H315: Causes skin irritation. H319: Causes serious eye irritation. H336: May cause drowsiness or dizziness.

**Styrene Acrylic Polymer Resin:** This is a self-classification.

*Classification:*Skin Irritation Category 2, Eye Irritation Category 2A, Specific Target Organ Toxicity (Inhalation-Irritation) Single Exposure Category 3

*Hazard Statements:*H315: Causes skin irritation. H319: Causes serious eye irritation. H335: May cause respiratory irritation.

**C.I. Pigment Black 7 and C.I. Pigment White 7:** This is a self-classification.

*Classification:*Carcinogenic Category 2

*Hazard Statements:*H350i: May cause cancer by inhalation.

**Proprietary Blue Pigment and Proprietary Green Pigment:** This is a self-classification.

*Classification (Under U.S. OSHA only):*Combustible Dust Hazard

*Hazard Statements:*None applicable.

**Proprietary Red Pigment # 2:** This is a self-classification.

*Classification:*Skin Sensitization Category 1B

*Hazard Statements:*H317: May cause an allergic skin reaction.

**Proprietary Violet Pigment:** This is a self-classification.

*Classification:*eye Irritation Category 2A

*Hazard Statements:*H319: Causes serious eye irritation.

**Proprietary Yellow Pigment # 2:** This is a self-classification.

*Classification:*Acute Oral Toxicity Category 4, Aquatic Acute Toxicity Category 3, Aquatic Chronic Toxicity Category 4

*Hazard Statements:*H302: Harmful if swallowed. H402: Harmful to aquatic life. H413: May cause long-lasting harmful effects to aquatic life.

New Zealand HSNO COP 8-1 09-06: The following are classifications under HSNO for components in pure form. These classifications do not apply to the product. Refer to Section 2 for product classification.

**Proprietary Primary Alcohol:**

3.1B: Flammable Liquids: high hazard

6.1E (Oral): Acutely toxic

6.3B: Mildly irritating to the skin.

6.4A: Irritating to the eye.

**C.I. Pigment Black 7:**

6.3B: Mildly irritating to the skin.

6.4A: Irritating to the eye.

6.7B: Suspected human carcinogen.

**Proprietary Red Pigment # 2:**

6.4A: Irritating to the eye.

9.1C (fish): Harmful in the aquaticenvironment.

**Proprietary Violet Pigment:**

6.4A: Irritating to the eye.

**C.I. Pigment Black 7:**

6.3B: Mildly irritating to the skin.

6.4A: Irritating to the eye.

6.7B: Suspected human carcinogen.

**16. OTHER INFORMATION (Continued)**

**PREPARED BY:** CHEMICAL SAFETY ASSOCIATES, Inc., PO Box 1961, Hilo, HI96721•800/441-3365

**REVISION INFORMATION:** March 2016: Up-date of entire SDS to add GHS classification and up-date for all components. Removal of EU DPD classification throughout SDS. May 2018: Review and up-date of entire SDS to most current regulations.

**DATE OF PRINTING:** October 15, 2018

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| The data in this Material Safety Data Sheet is true and accurate to the best of Royal Marker LLC Ink knowledge. However, since data, safety standards, and government regulations are subject to change conditions of handling, use, or misuse are beyond Royal Marker LLC control, Royal Marker LLC MAKES NO WARRANTY, EITHER EXPRESSED OR IMPLIED, WITH RESPECT TO THE COMPLETENESS OR CONTINUING ACCURACY OF THE INFORMATION CONTAINED HEREIN AND DISCLAIMS ALL LIABILITY FOR RELIANCE THEREON. The user is required to comply with all laws and regulations relating to the purchase, use, storage, and disposal of the product. User must be familiar with and follow generally accepted safe handling procedures of chemicals, and is solely responsible for any effects caused by its misuse or mixing of this chemical with any other substance. |

**DEFINITIONS OF TERMS**

A large number of abbreviations and acronyms appear on a MSDS. Some of these, which are commonly used, include the following:

**CAS #**: This is the Chemical Abstract Service Number that uniquely identifies each constituent.

**EXPOSURE LIMITS IN AIR:**

**CEILING LEVEL:** The concentration that shall not be exceeded during any part of the working exposure.

**DFG MAK Germ Cell Mutagen Categories: 1:** Germ cell mutagens which have been shown to increase the mutant frequency in the progeny of exposed humans. **2:** Germ cell mutagens which have been shown to increase the mutant frequency in the progeny of exposed mammals. **3A:** Substances which have been shown to induce genetic damage in germ cells of human of animals, or which produce mutagenic effects in somatic cells of mammals *in vivo* and have been shown to reach the germ cells in an active form. **3B:** Substances which are suspected of being germ cell mutagens because of their genotoxic effects in mammalian somatic cell *in vivo*; in exceptional cases, substances for which there are no *in vivo* data, but which are clearly mutagenic *in vitro* and structurally related to known in vivo mutagens. **4:** Not applicable (Category 4 carcinogenic substances are those with non-genotoxic mechanisms of action. By definition, germ cell mutagens are genotoxic. Therefore, a Category 4 for germ cell mutagens cannot apply. At some time in the future, it is conceivable that a Category 4 could be established for genotoxic substances with primary targets other than DNA [e.g. purely aneugenic substances] if research results make this seem sensible.) **5:** Germ cell mutagens, the potency of which is considered to be so low that, provided the MAK value is observed, their contribution to genetic risk for humans is expected not to be significant.

**DFG MAK Pregnancy Risk Group Classification:Group A:** A risk of damage to the developing embryo or fetus has been unequivocally demonstrated. Exposure of pregnant women can cause damage of the developing organism, even when MAK and BAT (Biological Tolerance Value for Working Materials) values are observed. **Group B:** Currently available information indicates a risk of damage to the developing embryo or fetus must be considered to be probable. Damage to the developing organism cannot be excluded when pregnant women are exposed, even when MAK and BAT values are observed. **Group C:** There is no reason to fear a risk of damage to the developing embryo or fetus when MAK and BAT values are observed. **Group D:** Classification in one of the groups A-C is not yet possible because, although the data available may indicate a trend, they are not sufficient for final evaluation.

**IDLH-Immediately Dangerous to Life and Health:** This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury.

**LOQ:** Limit of Quantitation.

**MAK:** Federal Republic of Germany Maximum Concentration Values in the workplace.

**NE:** Not Established. When no exposure guidelines are established, an entry of NE is made for reference.

**NIC:** Notice of Intended Change.

**NIOSH CEILING:** The exposure that shall not be exceeded during any part of the workday. If instantaneous monitoring is not feasible, the ceiling shall be assumed as a 15-minute TWA exposure (unless otherwise specified) that shall not be exceeded at any time during a workday.

**NIOSH RELs:** NIOSH’s Recommended Exposure Limits.

**PEL-Permissible Exposure Limit:** OSHA’s Permissible Exposure Limits. This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, “Vacated 1989 PEL,” is placed next to the PEL that was vacated by Court Order.

**SKIN:** Used when a there is a danger of cutaneous absorption.

**STEL-Short Term Exposure Limit:** Short Term Exposure Limit, usually a 15-minute time-weighted average (TWA) exposure that should not be exceeded at any time during a workday, even if the 8-hr TWA is within the TLV-TWA, PEL-TWA or REL-TWA.

**TLV-Threshold Limit Value:** An airborne concentration of a substance that represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour.

**TWA-Time Weighted Average:** T**i**me Weighted Average exposure concentration for a conventional 8-hr (TLV, PEL) or up to a 10-hr (REL) workday and a 40-hr workweek.

**HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS:**This rating system was developed by the National Paint and Coating Association and has been adopted by industry to identify the degree of chemical hazards.

**HEALTH HAZARD:0** (Minimal Hazard: No significant health risk, irritation of skin or eyes not anticipated. *Skin Irritation*: Essentially non-irritating. PII or Draize = “0”. *Eye Irritation*: Essentially non-irritating, or minimal effects which clear in < 24 hours [e.g. mechanical irritation]. Draize = “0”. *Oral Toxicity LD50 Rat*: < 5000 mg/kg. *Dermal Toxicity LD50Rat or Rabbit*: < 2000 mg/kg. *Inhalation Toxicity 4-hrs LC50 Rat*: < 20 mg/L.); **1** (Slight Hazard: Minor reversible Injury may occur; slightly or mildly irritating. *Skin Irritation*: Slightly or mildly irritating. *Eye Irritation*: Slightly or mildly irritating. *Oral Toxicity LD50 Rat*: > 500-5000 mg/kg. *Dermal Toxicity LD50Rat or Rabbit*: > 1000-2000 mg/kg. *Inhalation Toxicity LC50*4-hrs *Rat*: > 2-20 mg/L); **2** (Moderate Hazard: Temporary or transitory injury may occur. *Skin Irritation*: Moderately irritating; primary irritant; sensitizer. PII or Draize > 0, < 5. *Eye Irritation*: Moderately to severely irritating and/or corrosive; reversible corneal opacity; corneal involvement or irritation clearing in 8-21 days. Draize > 0, < 25. *Oral Toxicity LD50 Rat*: > 50-500 mg/kg. *Dermal Toxicity LD50Rat or Rabbit*: > 200-1000 mg/kg. *Inhalation Toxicity LC50 4-hrs Rat*: > 0.5-2 mg/L.);**3** (Serious Hazard: Major injury likely unless prompt action is taken and medical treatment is given; high level of toxicity; corrosive.

**HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):**

**HEALTH HAZARD (continued):3 (continued):** *Eye Irritation*: Corrosive, irreversible destruction of ocular tissue; corneal involvement or irritation persisting for more than 21 days. Draize > 80 with effects irreversible in 21 days. *Oral Toxicity LD50 Rat*: > 1-50 mg/kg. *Dermal Toxicity LD50Rat or Rabbit*: > 20-200 mg/kg. *Inhalation Toxicity LC50 4-hrs Rat*: > 0.05-0.5 mg/L.); **4** (Severe Hazard: Life-threatening; major or permanent damage may result from single or repeated exposure. *Skin Irritation*: Not appropriate. Do not rate as a “4”, based on skin irritation alone. *Eye Irritation*: Not appropriate. Do not rate as a “4”, based on eye irritation alone. *Oral Toxicity LD50 Rat*: < 1 mg/kg. *Dermal Toxicity LD50Rat or Rabbit*: < 20 mg/kg. *Inhalation Toxicity LC50 4-hrs Rat*: < 0.05 mg/L).

**FLAMMABILITY HAZARD:0** (Minimal Hazard-Materials that will not burn in air when exposure to a temperature of 815.5°C [1500°F] for a period of 5 minutes.); **1** (Slight Hazard-Materials that must be pre-heated before ignition can occur. Material require considerable pre-heating, under all ambient temperature conditions before ignition and combustion can occur, Including: Materials that will burn in air when exposed to a temperature of 815.5°C (1500°F) for a period of 5 minutes or less; Liquids, solids and semisolids having a flash point at or above 93.3°C [200°F] (e.g. OSHA Class IIIB, or; Most ordinary combustible materials [e.g. wood, paper, etc.]; **2** (Moderate Hazard-Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not, under normal conditions, form hazardous atmospheres in air, but under high ambient temperatures or moderate heating may release vapor in sufficient quantities to produce hazardous atmospheres in air, Including: Liquids having a flash-point at or above 37.8°C [100°F]; Solid materials in the form of course dusts that may burn rapidly but that generally do not form explosive atmospheres; Solid materials in a fibrous or shredded form that may burn rapidly and create flash fire hazards (e.g. cotton, sisal, hemp; Solids and semisolids that readily give off flammable vapors.); **3** (Serious Hazard- Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures, or, unaffected by ambient temperature, are readily ignited under almost all conditions, including: Liquids having a flash point below 22.8°C [73°F] and having a boiling point at or above 38°C [100°F] and below 37.8°C [100°F] [e.g. OSHA Class IB and IC]; Materials that on account of their physical form or environmental conditions can form explosive mixtures with air and are readily dispersed in air [e.g., dusts of combustible solids, mists or droplets of flammable liquids]; Materials that burn extremely rapidly, usually by reason of self-contained oxygen [e.g. dry nitrocellulose and many organic peroxides]); **4** (Severe Hazard-Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air, and which will burn readily, including: Flammable gases; Flammable cryogenic materials; Any liquid or gaseous material that is liquid while under pressure and has a flash point below 22.8°C [73°F] and a boiling point below 37.8°C [100°F] [e.g. OSHA Class IA; Material that ignite spontaneously when exposed to air at a temperature of 54.4°C [130°F] or below [e.g. pyrophoric]).

**PHYSICAL HAZARD:0** (*Water Reactivity*: Materials that do not react with water. *Organic Peroxides*: Materials that are normally stable, even under fire conditions and will not react with water. *Explosives*: Substances that are Non-Explosive. Unstable *Compressed Gases*: No Rating. *Pyrophorics*: No Rating. *Oxidizers*: No “0” rating allowed. *Unstable Reactives*: Substances that will not polymerize, decompose, condense or self-react.);**1** (*Water Reactivity*: Materials that change or decompose upon exposure to moisture. *Organic Peroxides*: Materials that are normally stable, but can become unstable at high temperatures and pressures. These materials may react with water, but will not release energy. *Explosives*: Division 1.5 & 1.6 substances that are very insensitive explosives or that do not have a mass explosion hazard. *Compressed Gases*: Pressure below OSHA definition. *Pyrophorics*: No Rating. *Oxidizers*: Packaging Group III; Solids: any material that in either concentration tested, exhibits a mean burning time less than or equal to the mean burning time of a 3:7 potassium bromate/cellulose mixture and the criteria for Packing Group I and II are not met. Liquids: any material that exhibits a mean pressure rise time less than or equal to the pressure rise time of a 1:1 nitric acid (65%)/cellulose mixture and the criteria for Packing Group I and II are not met. *Unstable Reactives*: Substances that may decompose, condense or self-react, but only under conditions of high temperature and/or pressure and have little or no potential to cause significant heat generation or explosive hazard. Substances that readily undergo hazardous polymerization in the absence of inhibitors.); **2** (*Water Reactivity*: Materials that may react Violently with water. *Organic Peroxides*: Materials that, in themselves, are normally unstable and will readily undergo Violet chemical change, but will not detonate. These materials may also react Violently with water. *Explosives*: Division 1.4 – Explosive substances where the explosive effect are largely confined to the package and no projection of fragments of appreciable size or range are expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package. *Compressed Gases*: Pressurized and meet OSHA definition but < 514.7 psi absolute at 21.1°C (70°F) [500 psig]. *Pyrophorics*: No Rating. *Oxidizers*: Packing Group II Solids: any material that, either in concentration tested, exhibits a mean burning time of less than or equal to the mean burning time of a 2:3 potassium bromate/cellulose mixture and the criteria for Packing Group I are not met. Liquids: any material that exhibits a mean pressure rise time less than or equal to the pressure rise of a 1:1 aqueous sodium chlorate solution (40%)/cellulose mixture and the criteria for Packing Group I are not met.

**DEFINITIONS OF TERMS (Continued)**

**HAZARDOUS MATERIALS IDENTIFICATION SYSTEM HAZARD RATINGS (continued):**

**PHYSICAL HAZARD (continued):3 (continued):** *Unstable Reactives*: Substances that may polymerize, decompose, condense, or self-react at ambient temperature and/or pressure, but have a low potential for significant heat generation or explosion. Substances that readily form peroxides upon exposure to air or oxygen at room temperature); **3** (*Water Reactivity*: Materials that may form explosive reactions with water. *Organic Peroxides*: Materials that are capable of detonation or explosive reaction, but require a strong initiating source, or must be heated under confinement before initiation; or materials that react explosively with water. *Explosives*: Division 1.2 – Explosive substances that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but do not have a mass explosion hazard. *Compressed Gases*: Pressure > 514.7 psi absolute at 21.1°C (70°F) [500 psig]. *Pyrophorics*: No Rating. *Oxidizers*: Packing Group I Solids: any material that, in either concentration tested, exhibits a mean burning time less than the mean burning time of a 3.:2 potassium bromate/cellulose mixture. Liquids: Any material that spontaneously ignites when mixed with cellulose in a 1:1 ratio, or which exhibits a mean pressure rise time less than the pressure rise time of a 1:1 perchloric acid (50%)/cellulose mixture. *Unstable Reactives*: Substances that may polymerize, decompose, condense or self-react at ambient temperature and/or pressure and have a moderate potential to cause significant heat generation or explosion.); **4** (*Water Reactivity*: Materials that react explosively with water without requiring heat or confinement. *Organic Peroxides*: Materials that are readily capable of detonation or explosive decomposition at normal temperature and pressures. *Explosives*: Division 1.1 & 1.2-explosive substances that have a mass explosion hazard or have a projection hazard. A mass explosion is one that affects almost the entire load instantaneously. *Compressed Gases*: No Rating. *Pyrophorics*: Add to the definition of Flammability “4”. *Oxidizers*: No “4” rating. *Unstable Reactives*: Substances that may polymerize, decompose, condense or self-react at ambient temperature and/or pressure and have a high potential to cause significant heat generation or explosion.).

**NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS:**

HEALTH HAZARD: **0** (materials that, under emergency conditions, would offer no hazard beyond that of ordinary combustible materials): Gases and vapors whose LC50 for acute inhalation toxicity is greater than 10,000 ppm. Dusts and mists whose LC50 for acute inhalation toxicity is greater than 200 mg/L. Materials whose LD50 for acute dermal toxicity is greater than 2000 mg/kg. Materials whose LD50 for acute oral toxicity is greater than 2000 mg/kg. Materials that are essentially non-irritating to the respiratory tract, eyes and skin. **1** (materials that, under emergency conditions, can cause significant irritation): Gases and vapors whose LC50 for acute inhalation toxicity is greater than 5,000 ppm but less than or equal to 10,000 ppm. Dusts and mists whose LC50 for acute inhalation toxicity is greater than 10 mg/L but less than or equal to 200 mg/L. Materials whose LD50 for acute dermal toxicity is greater than 1000 mg/kg but less than or equal to 2000 mg/kg. Materials whose LD50 for acute oral toxicity is greater than 500 mg/kg but less than or equal to 2000 mg/kg. Materials that cause slight to moderate irritation to the respiratory tract, eyes and skin. **2** (materials that, under emergency conditions, can cause temporary incapacitation or residual injury): Gases and vapors whose LC50 for acute inhalation toxicity is greater than 3,000 ppm but less than or equal to 5,000 ppm. Dusts and mists whose LC50 for acute inhalation toxicity is greater than 2 mg/L but less than or equal to 10 mg/L. Materials whose LD50 for acute dermal toxicity is greater than 200 mg/kg but less than or equal to 1000 mg/kg. Materials whose LD50 for acute oral toxicity is greater than 50 mg/kg but less than or equal to 500 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC50 for acute inhalation toxicity, if its LC50 is less than or equal to 5000 ppm and that does not meet the criteria for either degree of hazard 3 or degree of hazard 4. Compressed liquefied gases with boiling points between -30°C (-22°F) and -55°C (-66.5°F) that cause severe tissue damage, depending on duration of exposure. Materials that are respiratory irritants. Materials that cause severe, but reversible irritation to the eyes or are lachrymators. Materials that are primary skin irritants or sensitizers.**3** (materials that, under emergency conditions, can cause serious or permanent injury): Gases and vapors whose LC50 for acute inhalation toxicity is greater than 1,000 ppm but less than or equal to 3,000 ppm. Dusts and mists whose LC50 for acute inhalation toxicity is greater than 0.5 mg/L but less than or equal to 2 mg/L. Materials whose LD50 for acute dermal toxicity is greater than 40 mg/kg but less than or equal to 200 mg/kg. Materials whose LD50 for acute oral toxicity is greater than 5 mg/kg but less than or equal to 50 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC50 for acute inhalation toxicity, if its LC50 is less than or equal to 3000 ppm and that does not meet the criteria for degree of hazard 4. Compressed liquefied gases with boiling points between -30°C (-22°F) and -55°C (-66.5°F) that cause frostbite and irreversible tissue damage. Materials that are respiratory irritants. Cryogenic gases that cause frostbite and irreversible tissue damage. Materials that are corrosive to the respiratory tract. Materials that are corrosive to the eyes or cause irreversible corneal opacity. Materials that are corrosive to the skin. **4** (materials that, under emergency conditions, can be lethal): Gases and vapors whose LC50 for acute inhalation toxicity less than or equal to 1,000 ppm. Dusts and mists whose LC50 for acute inhalation toxicity is less than or equal to 0.5 mg/L. Materials whose LD50 for acute dermal toxicity is less than or equal to 40 mg/kg. Materials whose LD50 for acute oral toxicity is less than or equal to 5 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC50 for acute inhalation toxicity, if its LC50 is less than or equal to 1000 ppm.

FLAMMABILITY HAZARD: **0** Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand: Materials that will not burn in air when exposed to a temperature of 816°C (1500°F) for a period of 5 minutes in according with Annex D. **1**  Materials that must be preheated before ignition can occur. Materials in this degree require considerable preheating, under all ambient temperature conditions, before ignition and combustion can occur: Materials that will burn in air when exposed to a temperature of 816°C (1500°F) for a period of 5 minutes in accordance with Annex D. Liquids, solids and semisolids having a flash point at or above 93.4°C (200°F) (i.e. Class IIIB liquids). Liquids with a flash point greater than 35°C (95°F) that do not sustain combustion when tested using the Method of Testing for Sustained Combustibility, per 49 CFR 173, Appendix H or the UN Recommendation on the Transport of Dangerous Goods, Model Regulations (current edition) and the related Manual of Tests and Criteria (current edition). Liquids with a flash point greater than 35°C (95°F) in a water-miscible solution or dispersion with a water non-combustible liquid/solid content of more than 85 percent by weight. *Skin Irritation*: Severely irritating and/or corrosive; may destroy dermal tissue, cause skin burns, dermal necrosis. PII or Draize > 5-8 with destruction of tissue.

**NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS (continued):**

FLAMMABILITY HAZARD (continued): **1 (continued):** Liquids that have no fire point when tested by ASTM D 92 Standard Test Method for Flash and Fire Points by Cleveland Open Cup, up to a boiling point of the liquid or up to a temperature at which the sample being tested shows an obvious physical change.Combustible pellets with a representative diameter of greater than 2 mm (10 mesh). Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed up flash point of the solvent. Most ordinary combustible materials. **2** Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not under normal conditions form hazardous atmospheres with air, but under high ambient temperatures or under moderate heating could release vapor in sufficient quantities to produce hazardous atmospheres with air: Liquids having a flash point at or above 37.8°C (100°F) and below 93.4°C (200°F) (i.e. Class II and Class IIIA liquids.) Solid materials in the form of powders or coarse dusts of representative diameter between 420 microns (40 mesh) and 2 mm (10 mesh) that burn rapidly but that generally do not form explosive mixtures in air. Solid materials in fibrous or shredded form that burn rapidly and create flash fire hazards, such as cotton, sisal and hemp. Solids and semisolids that readily give off flammable vapors. Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent.**3** Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures or, though unaffected by ambient temperatures, are readily ignited under almost all conditions: Liquids having a flash point below 22.8°C (73°F) and having a boiling point at or above 37.8°C (100°F) and those liquids having a flash point at or above 22.8°C (73°F) and below 37.8°C (73°F) and below 37.8°C (100°F) (i.e. Class IB and IC liquids). Materials that, on account of their physical form or environmental conditions, can form explosive mixtures with air and are readily dispersed in air. Flammable or combustible dusts with a representative diameter less than 420 microns (40 mesh). Materials that burn with extreme rapidity, usually by reason of self-contained oxygen (e.g. dry nitrocellulose and many organic peroxides). Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent.**4** Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air and will burn readily: Flammable gases. Flammable cryogenic materials. Any liquid or gaseous materials that is liquid while under pressure and has a flash point below 22.8°C (73°F) and a boiling point below 37.8°C (100°F) (i.e. Class IA liquids). Materials that ignite when exposed to air, Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent.

INSTABILITY HAZARD: **0** Materials that in themselves are normally stable, even under fire conditions: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) below 0.01 W/mL. Materials that do not exhibit an exotherm at temperatures less than or equal to 500°C (932°F) when tested by differential scanning calorimetry. **1** Materials that in themselves are normally stable, but that can become unstable at elevated temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 0.01 W/mL and below 10 W/mL. **2** Materials that readily undergo Violet chemical change at elevated temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 10 W/mL and below 100W/mL. **3** Materials that in themselves are capable of detonation or explosive decomposition or explosive reaction, but that require a strong initiating source or that must be heated under confinement before initiation: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 100 W/mL and below 1000 W/mL. Materials that are sensitive to thermal or mechanical shock at elevated temperatures and pressures.**4** Materials that in themselves are readily capable of detonation or explosive decomposition or explosive reaction at normal temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) of 1000 W/mL or greater. Materials that are sensitive to localized thermal or mechanical shock at normal temperatures and pressures.

**FLAMMABILITY LIMITS IN AIR**:

Much of the information related to fire and explosion is derived from the **N**ational **F**ire **P**rotection **A**ssociation (**NFPA**). Flash Point - Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. Autoignition Temperature: The minimum temperature required to initiate combustion in air with no other source of ignition. LEL - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. UEL - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

**TOXICOLOGICAL INFORMATION:**

**Human and Animal Toxicology:** Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD50** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC50** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m3** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo**, **LDLo**, and **LDo**, or **TC**, **TCo**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects. **Cancer Information:** The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. **Other Information: BEI** - ACGIH Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV.

**DEFINITIONS OF TERMS (Continued)**

**TOXICOLOGICAL INFORMATION (continued):**

A mutagen is a chemical that causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An embryotoxin is a chemical that causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical that causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance that interferes in any way with the reproductive process.

**ECOLOGICAL INFORMATION:**

EC is the effect concentration in water. **BCF** = Bioconcentration Factor, which is used to determine if a substance will concentrate in lifeforms which consume contaminated plant or animal matter. **TLm** = median threshold limit; Coefficient of Oil/Water Distribution is represented by **log Kow**or **log Koc**and is used to assess a substance’s behavior in the environment.

**REGULATORY INFORMATION:**

**U.S. and CANADA:**

**ACGIH:** American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits.

This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. **O**ccupational **S**afety and **H**ealth **A**dministration (**OSHA**). **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **DOT** and **TC** are the U.S. Department of Transportation and the Transport Canada, respectively. Superfund Amendments and Reauthorization Act **(SARA)**; the CanadianDomestic/Non-Domestic Substances List **(DSL/NDSL)**; the U.S. Toxic Substance Control Act **(TSCA)**; Marine Pollutant status according to the **DOT**; the Comprehensive Environmental Response, Compensation, and Liability Act **(CERCLA or Superfund)**; and various state regulations. This section also includes information on the precautionary warnings which appear on the material’s package label. **OSHA** - U.S. Occupational Safety and Health Administration.

**EUROPEAN and INTERNATIONAL:**

**The DFG:** Thisis the Federal Republic of Germany’s Occupation Health Agency, similar to the U.S. OSHA. **EU** is the European Union (formerly known as the **EEC,** European Economic Community). **EINECS:** This is the European Inventory of Now-Existing Chemical Substances. The **ARD** is the European Agreement Concerning the International Carriage of Dangerous Goods by Road and the **RID** are the International Regulations Concerning the Carriage of Dangerous Goods by Rail. **AICS** is the Australian Inventory of Chemical Substances. **METI** is the Japanese Ministry of Economy, Trade, and Industry.